

## **Comment Letter on U. S. Fish and Wildlife Service Draft Land-Based Wind Energy Guidelines**

**Prepared by Taber D. Allison, Ph. D., Director, Research and Evaluation, American Wind Wildlife Institute and Member, USDOJ Wind Turbine Guidelines Advisory Committee<sup>1, 2</sup>**

The US Fish and Wildlife Service (Service) has released for public comment “Draft Guidelines for Land-based Wind Energy Development” (draft Guidelines). The Service based the draft Guidelines on the recommendations of the Wind Turbine Guidelines Advisory Committee constituted in October 2007 under the Federal Advisory Committee Act by the Secretary of the Interior. The Committee submitted its recommendations to the Secretary on March 4, 2010 (Recommendations).

The stated purpose of the draft Guidelines is to 1) promote compliance with relevant wildlife laws and statutes, 2) encourage scientifically rigorous survey, monitoring, assessment, and research designs proportionate to the risk to the affected species, 3) produce potentially comparable data, 4) avoid, minimize, and/or compensate for potential adverse effects on fish, wildlife and their habitats, 5) and improve the ability to predict and resolve effects locally, regionally, and nationally (from p. 3, draft Guidelines).

As the Service indicates in the draft Guidelines, there is substantial conservation benefit to be gained by establishing a process consistent with the Service’s support of the role of wind energy development in reducing the threat of accelerated climate change, “.....the single biggest threat to wildlife”<sup>3</sup> and its responsibility to minimize impacts to wildlife and their habitats by energy development. Both the Recommendations and the draft Guidelines are intended to be voluntary, and they

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<sup>1</sup> The views expressed in this comment letter do not necessarily reflect the views of AWWI Partner organizations, and these comments are not intended to substitute for or replace comments submitted by Partner organizations.

<sup>2</sup> As member of the Advisory Committee, I chaired the Technical Committee charged with providing recommendations on methods and metrics, and I was a member of the Synthesis Committee, which developed the multiple drafts of the Recommendations and incorporated comments from caucus and agency review.

<sup>3</sup> <http://www.fws.gov/home/climatechange/>

are expansive in their reach extending risk assessment for wind energy development to non-regulated species and their habitats, e.g., grouse and bats. Thus, significant conservation benefit will result if there is adherence to these voluntary Guidelines.

My review of the draft Guidelines is technical in nature, focusing on the need for clarity and scientific rigor in the draft Guidelines – qualities that are needed for adherence to the intent of the draft Guidelines. One of the major drawbacks of the current draft Guidelines is that they don't take full advantage of a risk-based tiered approach that focuses effort and allocation of limited resources by the Service and the Industry on the issues of greatest conservation concern. In addition to my comments on the tiered approach, I am concerned about insufficient scientific rigor in many of the draft Guidelines recommendations for assessing potential impacts to wildlife, and I highlight a few of the more significant issues for the Service's consideration.

The document also provides ambiguous or contradictory recommendations. This is a major issue as the user of the document will be confused as to what the Guidelines intend. At the April 27, 2011 meeting of the Committee in Washington, D. C., the Service acknowledged a lack of clarity indicating that the Service's intent was to follow the March 2010 recommendations (see below for more discussion on this point). Ideally these issues will be corrected in a revision that is clearer and without ambiguity and contradiction.

### A Risk-Based Conceptual Framework

The March 2010 Recommendations were based on a risk assessment framework described as a tiered approach. The Recommendations defined the tiered approach as “an iterative decision-making process for collecting information in increasing detail, quantifying the possible risks of proposed wind energy projects to wildlife and habitats, and evaluating those risks to make siting, construction, and operation decisions.”<sup>4</sup> The Recommendations further went on to describe that the intent of the tiered approach was to “assess the risks of project development by formulating

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<sup>4</sup> U. S. Fish and Wildlife Service Wind Turbines Guidelines Advisory Committee. March 4, 2010. Recommended Guidelines, p.i

questions that relate to site-specific conditions regarding potential species and habitat impacts.”<sup>5</sup>

The tiered approach is a framework articulating a process of risk assessment. As defined by the Recommendations the framework consists of five tiers – three preconstruction tiers, and two post-construction tiers. The decision to progress to a higher tier depends on what is learned at the previous tier. At the beginning of each tier there is the essential step of problem formulation or question development, which helps the user characterize the level of uncertainty in assessing the risk of impact in the development of the project and define the information needed to reduce that uncertainty. Thus, the need to progress to higher tiers is determined by uncertainty in the risk assessment. If the uncertainty is higher, more detailed and complex studies will be needed to collect the information needed to reduce that uncertainty.

For example, a project developer may determine with high certainty at Tier 2 that a potential project at a site has an unacceptably high risk that cannot be adequately mitigated, and the project is abandoned. Conversely, the developer may also conclude with high certainty that a project has low or minimal risk of impact; the developer can then proceed to project development. There will be no need to proceed to Tier 3 in either situation.

A comparable relationship exists between pre-construction and post-construction tiers. A developer may determine with high certainty that a project has minimal risk of impact at Tier 2 or Tier 3 and therefore does not need to conduct post-construction studies described in Tier 4 and Tier 5. Conversely, the uncertainty in the risk assessment may necessitate Tier 4 studies to confirm the prediction of project impact as low, medium, or high relative to other projects.

#### Concerns with the Draft Guidelines Application of the Tiered Approach

At the April 27<sup>th</sup> meeting, the Service stated that it was their intent to apply the tiered approach as contained in the Recommendations. This intent is apparent throughout the document where sections of the Recommendations are used without

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<sup>5</sup> Ibid, p. ii

change or with only minor changes in wording. There are, however, numerous instances where key components of the tiered approach are missing or the description is unclear, contradictory, or ambiguous, therefore undermining the rigor and the intent of the approach. For example, the draft Guidelines appear to propose data collection regardless of the level of uncertainty. The overall effect is to convert the tiered approach from a process of reducing uncertainty to a series of hurdles that need to be overcome.

Some specific examples follow:

1) Elimination of the problem formulation stage

Figure 2, p. 17 of the draft Guidelines depicts a “Decision Tree for Tier Approach”. The figure eliminates the problem formulation stage as depicted in the flow chart provided in the Recommendations. As described above, the problem formulation stage is essential in determining whether and how a developer should proceed with a tier and in defining the problems to be addressed and the information needed to reduce uncertainty. Apparent elimination of the problem formulation stage also occurs in the text. For example, on page 25 of the Recommendations, the section “Tier 3 Questions” begins with a detailed discussion of the problem formulation stage. Problem formulation is important at Tier 3, in particular, because this Tier encompasses complex, quantitative field studies, and problem formulation helps ensure that resources are allocated efficiently and appropriately. This discussion on problem formulation is removed from the draft Guidelines.

I strongly encourage including a problem formulation step in Figure 2 of the Decision Tree for the Tiered Approach, and including problem formulation explicitly in the appropriate places in the descriptions of each tier.

2) Data requirements are not driven by uncertainty in the potential risk assessment

- a) In the Tier 2 Decision Process<sup>6</sup>, the draft Guidelines state that a developer should proceed to Tier 3 if there is an indication of “a low probability of

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<sup>6</sup> U. S. Fish and Wildlife Service Wind Turbines Guidelines Advisory Committee. March 4, 2010. Recommended Guidelines, p. 30

adverse affects to fish and wildlife and their habitat”. Such a recommendation subverts the risk-based framework, by indicating that all Tiers are required regardless of uncertainty or risk.

I suggest that the Service restore the intent of the language used in the Tier 2 Decision Process of the March 2010 Recommendation’s<sup>7</sup>: the decision to proceed to Tier 3 is based on whether the answers to Tier 2 questions are inconclusive or the meaning of the answers is uncertain.

- b) The draft Guidelines appear to require three years of pre- and post-construction monitoring. On page 38 the draft states that three years of pre-construction studies may be appropriate in many circumstances, but data requirements will be based on many factors such as site sensitivity, affected species, and the availability of data from other sources. This apparent flexibility is undermined on page 39 by the statement that, “(a)s with pre-construction studies, post-construction fatality studies should be conducted for no less than three years...”

The duration of pre- or post-construction monitoring should be driven by the level of uncertainty in the risk assessment or uncertainty in predicted impact. For example, duration of study is driven by the need for information in reducing the uncertainty in the risk assessment. The Service indicated at the April 27<sup>th</sup> meeting that this was their intent for data collection, but the draft Guidelines suggest that data collection is independent of the level of uncertainty.

### 3) Ambiguous guidance on assessment needs

- a) In several places in the draft Guidelines there is reference to evaluations of adverse effects to fish and wildlife (e.g., p. 5). The glossary in the draft Guidelines refers to fish and wildlife as “(a)ll classes of wild animals including, but not limited to, any mammal, fish, bird, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate and any part, product, egg or offspring thereof”.

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<sup>7</sup> Ibid, p. 24

This expansive definition would seem to require that project developers assess potential impacts to thousands of species that have no demonstrated link to wind energy development. This scope of study lacks scientific authority and undermines the potential for voluntary adherence. It is more scientifically based, cost-effective, and of greater conservation benefit to focus Service and Industry resources on assessing the risk of a project to those species known to be vulnerable to wind energy development.

Thus, I encourage use of a definition that defines the scope of risk assessment to species that 1) are listed as an endangered, threatened or candidate species under the Endangered Species Act, are subject to the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act, or are designated by law, regulation or other formal process for protection and/or management by the relevant agency or other authority, or have been shown to be significantly adversely affected by wind energy development, and 2) are determined to be possibly affected by the project.

It is important to minimize ecosystem-level impacts of any development, such as impacts to soil ecosystems and biota, and such measures can be best achieved through best management practices in project siting, construction, and operation. Resources devoted to risk assessment and reducing uncertainty should be focused on specific taxa with known or anticipated vulnerabilities to wind energy development.

- b) Similarly, the draft Guidelines define the geographic boundaries of the risk assessment as the “Area of influence, a three dimensional area that includes the project site, and the area of potential “direct” and “indirect effects” of the project”. It is unclear from this definition whether the draft Guidelines require evaluation of potential project impacts for all fish and wildlife (as defined above) within the area of influence. The former definition appears to require a broader assessment of impacts beyond that which is scientifically defensible, and is not an effective allocation of limited Service or Industry resources.

I recommend a clarification of the intent of the draft Guidelines by revising the geographic scope of assessment to the “project site and species-specific areas of impact” as contained in the Recommendations.

- c) The draft Guidelines list a series of methods that can be used in Tier 3 studies, but guidance as to which methods are appropriate and how they should be utilized is absent. I agree with the statement in the draft Guidelines that “encourages the use of common methods and metrics in Tier 3 assessments...”, but the draft Guidelines do not provide guidance for which methods and metrics should be commonly used. Detailed guidance was provided in the Recommendations, and the Service has stated that this detail and guidance for Tier 3 studies was placed on the Service web site (<http://www.fws.gov/windenergy/references.html>), but this website also lacks guidance for many Tier 3 studies. Concerns with the website are described in more detail below.

I strongly recommend that the detailed guidance on the appropriate use of methods and metrics be restored.

- 4) Confusion over the definition and application of the tiered approach – the draft Guidelines state on p. 34 that “(i)t is during Tier 3 that a risk assessment is conducted.” As stated above, the tiered approach is a framework for conducting a risk assessment. Risk of a potential project is estimated at each tier, and it is the uncertainty in the risk assessment that drives decisions to move to higher tiers.

When the tiered approach is introduced at the beginning of the document it should be made clear that risk assessment is not confined to any particular tier, and that the product of following the tiered approach will be an assessment of risk.

### Concerns with Scientific Rigor

#### 1) “Consideration of Effects”

The draft Guidelines begin with a section “Factors to Consider When Assessing Effects” a potentially useful section highlighting issues of concern for wind energy

development and wildlife. Unfortunately, the information lacks sufficient detail and scientific authority. Hypothesized or speculated effects are assumed as given, and other effects are inappropriately defined, and inconsistently and inappropriately referenced. In many cases, cited references are not included in the literature cited section of the draft guidelines making it impossible to verify the information contained in the references.

- a) Collision and Barotrauma – the context of this section suggests that barotrauma is a given for both birds and bats without any supporting evidence or discussion. There is limited evidence indicating that death from barotrauma at wind facilities is an issue for bats, but the differences in lung structure between birds and bats indicate that birds are not susceptible to barotrauma. In addition, at least one study<sup>8</sup> suggests that collision may result in symptoms characteristic of barotrauma without also presenting obvious collision symptoms. Confusing fatalities from barotrauma with collision fatalities may overestimate the incidence of barotrauma.

Barotrauma in bats is a likely source of fatalities, but the importance of barotrauma as a source of bat fatalities at wind projects requires further scientific investigation, and this should be so indicated in the discussion of this potential effect.

If the final Guidelines retain this section, it would be useful to define barotrauma.

- b) Barrier effects – the draft Guidelines define these effects as the result of “species’ avoidance of a wind facility” resulting in an increase in energy use or decreased movement. This definition of barrier effects is more appropriately used to define avoidance behavior. A barrier is more appropriately defined as an environmental feature that prevents population movements that result in reduced gene flow and other related factors associated with population demographics.

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<sup>8</sup> Rollins, K.E., D.K., Meyerholz, G.D. Johnson, A.P. Capparella, and S.S. Loew. 2011. Cause of Bat Mortality at Wind Farms: Barotrauma vs. Collision. Presented at the Society for Integrative and Comparative Biology annual conference, January 2011, Salt Lake City, UT.



The references cited for barrier effects include several non-peer reviewed reports and peer-reviewed publications that refer to avoidance behavior by sea ducks observed in the offshore environment. Migrating sea ducks have been shown to avoid wind facilities, but they are not prevented from getting around the wind facility to continue along a migration path toward wintering or breeding grounds. No gene flow effect has been demonstrated or inferred from this behavior.

Displacement of sea ducks from feeding areas by offshore wind facilities is a potential impact, but this behavior has not been demonstrated definitively, the ecological consequences are unknown, and the behavior is not necessarily relevant to the land-based focus of the draft Guidelines.

As the draft Guidelines state, the population-level effects of the energetic “costs” of avoidance are not known (P.10). Finally, avoidance behavior demonstrated by sea ducks is cited elsewhere in the literature, and in the draft Guidelines, as a mechanism for reducing collision fatalities (see discussion below).

This section also describes as a barrier effect the result of a study on Bald Eagle at Kodiak Island, Alaska, which is more appropriately considered an example of avoidance behavior.<sup>9</sup> I suggest that the Service substitute the term “avoidance behavior” whenever it used in the context described above and use barrier effect in those demonstrated instances where a wind facility prevents or significantly restricts gene flow.

- c) Noise –the draft Guidelines state that noise effects on wildlife should be included in assessments of the impacts of wind turbine siting and operation (p.11). The relevant section on the Service website (<http://www.fws.gov/windenergy/references.html>) provides more detail than contained in the draft Guidelines, but doesn’t eliminate the fact that no

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<sup>9</sup> Sharp, L, C. Herrman, R. Friedel, K. Kosciuch and R. MacIntosh. 2010. Comparison of pre- and post- construction bald eagle use at the Pillar Mountain wind project, Kodiak, Alaska, Spring 2007 and 2010. Powerpoint Presentation for the National Wind Coordinating Collaborative Wind Wildlife Research Meeting VII October 19-21, 2010. Access on 16 December 2010 at:

[http://www.nationalwind.org/assets/research\\_meetings/Research\\_Meeting\\_VIII\\_Sharp.pdf](http://www.nationalwind.org/assets/research_meetings/Research_Meeting_VIII_Sharp.pdf)

studies have tied noise from wind facilities to impacts to wildlife. All studies relating to noise effects on wildlife are from other types of human activity. The website section on noise also combines concerns with birds hearing turbines and being displaced from suitable habitat with concerns about birds **not** hearing turbines and being at risk of collision.

The primary and presumed impact of noise on wildlife is displacement, and it is not feasible or an effective use of resources to determine whether noise or another aspect of operation of the wind facility is the cause of displacement – the different sources of human disturbance are confounded.

The Recommendations contain language on assessment of species sensitive to habitat fragmentation (and related displacement), and this language, largely contained in the draft Guidelines, sufficiently captures concerns related to noise impacts as well as other factors causing displacement.

- 2) Lack of authority for BMPs, mitigation, and methods and metrics – as referenced earlier there is a lack of guidance and scientific authority. The Recommendations provided detailed and authoritative guidance on the following methods:

- Use of acoustic monitoring
- Mist netting
- Raptor nest searches
- Bat exit counts
- Buffer recommendations for grouse lek and nesting habitat

I encourage the Service to provide more detailed guidance. Detailed guidance will help the Service achieve its goal of a common set of methods and metrics and lead to improved assessments of risk and impact of wind energy development. Detailed information on methods and metrics is not consistently available on the Service web site.

- 3) Resources web site – I have referenced some issues with this web site above. The Service described at the April 27<sup>th</sup> meeting that the information on this website is considered part of the Guidelines. The website suffers from many of the same weaknesses as the draft Guidelines. Many of the sections

inappropriately site references, uncritically cite non-peer-reviewed reports, or omit key references. In addition, the sections frequently do not provide more detailed guidance from what is lacking in the draft Guidelines, but often refer the reader to lists of reports and publications. If the Service wants to achieve its goal of common methods and metrics, it needs to provide more authoritative guidance to achieve that laudable goal.

The Service indicates that this website will be updated frequently, and the Service has also indicated that the website will be peer-reviewed, but there is a need for a clearly defined process for reviewing or updating the guidelines, and for determining how changes in information on the web site will apply to projects at different stages of risk or impact assessment. The references web site should clearly post the policy for how information contained on this website is to be used to demonstrate adherence to the Guidelines, and how the process by which information will be updated.

- 4) Internal contradictions – there are multiple examples in the draft Guidelines where contradictory guidance is provided. Some of these examples are described above. Another example of this internal contradiction is contained in the description of Tier 3 studies (see also my earlier comment on the noise section of the Resources website and my discussion of barrier effects) where the project developer is asked to assess acoustic fragmentation as it relates to habitat fragmentation and displacement (p. 32, Tier 3 question 4). Later in the document (p. 60, Chapter 6 Mitigation, Section C, Deterrent Devices) there is a detailed description of the use of noise (and other) deterrence mechanisms to reduce collision risk. These contradictory discussions do not provide a frame of reference to help users of the draft Guidelines determine which impact (displacement from noise or collision fatalities) is of greater concern to the Service, and the conflicting guidance makes adherence to the draft Guidelines very difficult.

Perhaps in its section “Consideration of Effects” the Service could reconcile this conflict between concerns about displacement and energetic costs of

avoidance with the behavioral benefit of avoidance in reducing exposure and collision risk.

5) Confusing terminology – I described above concerns about use of the phrase “Barrier Effect”. Other terms of concern include, but are not limited to:

a) Habitat – a term that is species specific, but is often used in the draft Guidelines in an ambiguous context suggesting a broader definition that is more appropriately described as cover type, ecological community or landscape. This ambiguity becomes an issue when the draft Guidelines suggests that assessing habitat impacts is a routine post-construction activity (e.g. Tier 4b). Habitat impacts are appropriately addressed when the risk assessment indicates that there will be impacts to the habitat of specific species of concern.

b) Fatality versus mortality – the glossary of the draft Guidelines appropriately defines and distinguishes these two terms, but the terms are used interchangeably in the text of the draft Guidelines. For example, Table 1 describes “increased mortality”, or “mortality greater than documented”, where fatality would be the appropriate term.

6) Citation of non-peer reviewed literature – Guidance on the assessment of potential effects and estimates of risk in the draft Guidelines rely substantially on non-peer reviewed reports. There should be a well described process for determining how non-peer reviewed reports will be identified and used to support risk assessments prescriptions. For many of the effects described, such as noise impacts, I recommend stating that while conclusive evidence is lacking for this possible impact related to land-based wind development, concerns have been raised and more studies are needed to adequately assess possible impacts and assessment needs. This approach would move some of the assessment needs contained in the draft Guidelines out of the realm of project risk assessment into research (see discussion on research below).

The March 2010 Recommendations were intentionally more prescriptive (see discussion of guidance on methods and metrics, mitigation, and BMPS above) when sufficient scientific justification was available, and the recommendations avoided prescriptive guidance when such justification was lacking. I recommend this approach for the Guidelines.

## Summary

I focused my comments on selected technical/scientific issues that I believe are most critical to address if the Service is to achieve the goals stated in the beginning of this letter and in the introduction to the draft Guidelines. The March 2010 Recommendations, on which the Service based its draft Guidelines extended protections to a large array of non-protected species and their habitats, such as grouse and bats. Both Recommendations and draft Guidelines are voluntary and require adherence to achieve the conservation benefit of this protection. Adherence depends on the final wind energy siting guidelines being clear and authoritative.

The draft Guidelines also state as a goal the efficient and effective allocation of resources in conducting risk assessments, and such an allocation will also have a conservation benefit. For example, the Service is asking wind developers to consult regularly with the Service, and the Service will want to focus its own limited staff resources on those issues of greatest conservation concern rather than speculative impacts that have little scientific support or conservation concern.

There are many uncertainties that remain in assessing risks to wildlife from the development of all sources of energy, including wind energy and the draft Guidelines recognize that additional research is needed to better assess risk, determine the consequences of impact, and evaluate measures to mitigate those impacts. It is appropriate that research not be a regular feature of individual projects. Research objectives will be best achieved by a partnership between the Service, state agencies, industry, and conservation organizations. As Director of Research for an organization whose mission is to promote the acquisition of knowledge to improve the siting of wind energy facilities and minimize impacts to

wildlife, I look forward to continuing to work with the Service to achieve these research goals.

Thank you for the opportunity to comment on these draft Guidelines.

Sincerely,

A handwritten signature in dark ink, reading "Taber D Allison" followed by a horizontal flourish line.

Taber D. Allison, Ph. D.